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Dressed for Battle: Investigations of an Etruscan Architectural Gigantomachy

Giovanni Verri – Katharine Raff – Clara Granzotto – Rachel Sabino

Abstract

The Art Institute of Chicago holds in its collections a rare Etruscan terracotta relief (1984.2) from the 3rd–2nd cent. B.C. depicting a male and female figure battling a struggling anguiped giant. Historically described as an antefix, it retains considerable original polychromy. The terracotta has been the subject of scientific and art-historical investigation regarding its function and paint layers. Painting materials identified include calcium carbonate, a carbon-based black, Egyptian blue, antlerite, madder lake, and hematite. While the exact function of the terracotta could not be unequivocally determined, the presence of madder lake and a plant gum as the possible binding medium appears to exclude its use in an exposed, outdoor context. Scientific investigations also revealed previously unseen details about the female figure's garment, which has previously been subject to speculation. The construction of the dress was also examined and its appearance is discussed, based on analytical evidence.

Keywords: Etruscan, terracotta, architectural relief, gigantomachy, madder, Egyptian blue, Visible-induced luminescence, ancient dress

Introduction

Identified generally as an architectural relief and dated to the 3rd–2nd cent. B.C., the polychrome Etruscan terracotta that is the subject of this study depicts three figures engaged in combat (Fig. 1)[1]. Although in a fragmentary condition, the group undoubtedly represents a gigantomachy – the mythological battle between the Olympian gods and the Giants depicted in both Greek and Etruscan art from the 6th cent. B.C.[2].

In the middle of the scene is a muscular male figure, whose snaky legs and large wing identify him as a giant[3]. He is nude, apart from a short cloak (chlamys) draped across both shoulders. To the left is a male figure, striding forward with his right leg advanced. He wears a large mantle (himation) around his body and left shoulder, leaving his chest exposed. On the right side is a female figure dressed in a long, sleeveless garment (either a chiton or a peplos) pinned at the shoulders and belted beneath the breasts, draped to create two vigorously billowing textile elements, at the waist and hip level.

The figures stand in high relief on a curved base and are attached at the back to a vertical slab that extends slightly above the figures' waists, giving the illusion of freestanding figures. Although the curved front of the base is largely a modern restoration, it follows the ancient curvature seen at the back, where remnants of projections on the left and right sides form an arch shape suggestive of a cover tile or another attachment to affix it to another surface.

1 Art Institute of Chicago, 1984.2. Provenance: Private collection, Switzerland (according to B. McAlpine in committee meeting minutes; copy in curatorial object file at the Art Institute of Chicago); acquired by Bruce (b. 1947) and Ingrid McAlpine (1939–2018), London, England, by 1984; sold to the Art Institute, 1984; <https://www.artic.edu/artworks/111030/architectural-relief-depicting-the-gigantomachy-battle-between-gods-and-giants> (08.08.2024).

2 LIMC IV (1988) 191–270 s. v. Gigantes (F. Vian – M. B. Moore).

3 On the Etruscan origins of the winged, anguiped Giant, see De Grummond 2000, 258–261.

1 Views of the terracotta gigantomachy at the Art Institute of Chicago (inv. 1984.2)

Dating, Iconography and Comparisons

While the terracotta has frequently been described as an antefix, it is also thought to have functioned as part of a pedimental sculpture, an acroterion, or a revetment plaque for the end of a beam[4]. However, the combination of the terracotta's fragmentary state and its restorations make it difficult to pinpoint its original function with certainty. A survey of the literature on Etruscan architectural terracottas has yielded few relevant comparisons of either form or iconography.

The terracotta has been conservatively dated on stylistic grounds to the 3rd to 2nd cent. B.C.[5]. The later date takes into account clear stylistic similarities to the Gigantomachy Frieze of the Pergamon Altar (which is dated to the first half of the 2nd cent. B.C.)[6]. The earlier date-range acknowledges artistic forerunners in the ancient Mediterranean, including in Etruria[7]. For example, two painted images of the winged, anguiped monster known as Typhon in the Tomb of the Typhon at Tarquinia have been dated as early as the mid-3rd cent. B.C.[8]. They are shown in a dramatic, angled pose resembling that of the Chicago giant, with their muscular, elongated bodies straining to support the ceiling. Further similarities are seen in the use of colour: much like the Chicago giant, the figures of Typhon are depicted with a ruddy skin tone, while the wings and the snakelike legs are painted blue with black scales[9].

4 As an antefix, see Strazzulla 1991, 1164; Alexander 1994, 33; De Puma 1994, 59. As pedimental sculpture, see the departmental committee meeting agenda, 6 January 1984, curatorial object file. As an acroterion, see Strazzulla 1991, 1164; Strazzulla 2007, 155. As a revetment plaque, see the scholar comment form by J. S. Østergaard, 29 March 1999, curatorial object file.

5 Previous thermoluminescence spectroscopy conducted by the Research Laboratory for Archaeology and the History of Art in Oxford on two different samples yielded results ‹between 1900 and 2900 years ago› and ‹more than 1500 years ago›. One sample was taken in 1980 ‹from the back› and a second in 1983 from ‹behind the feet of the male draped figure›. A copy of the reports is stored in the curatorial object file at the Art Institute of Chicago.

6 For a brief survey of the stylistic and contextual issues associated with the dating of the Pergamon Altar, see Ridgway 2000, 21 f. The Antikensammlung der Staatlichen Museen zu Berlin currently dates the Pergamon Altar to 170–160 B.C.: <https://id.smb.museum/object/829881/der-gro%C3%9Fe-altar-von-pergamon> (08.08.2024); Pollitt 1986, 102–105. 111–113.

7 De Grummond 2000, 260–262.

8 De Grummond 2000, 261.

9 For an overview of the paintings from the Tomb of the Typhon, see Steingräber 2006, 258–260.

In a seminal 1991 article, M. J. Strazzulla argued that the terracotta was likely a central acroterion of a small building, on the basis of its dimensions and curved base which would accommodate its placement at the end of the kalypter hegemon at the apex of the roof[10]. The closest comparison is an Archaic acroterion from Caere, which depicts a single, standing warrior approximately 60 cm in height, the projected height of the Chicago terracotta[11]. The warrior stands on a base with double-sloped top edges that form an oblique angle, suggesting its placement at the apex of the roof[12].

As an alternative, Strazzulla noted the possibility that the Chicago terracotta could have been a large antefix that belonged to a group depicting similar subjects, not unlike a group of figural antefixes from Bolsena, dated to the first half of the 2nd cent. B.C.[13]. The figures in this group are generally at least 45 cm in height, nearly freestanding, and likely the result of handwork[14]. One particular antefix, which depicts a striding Minerva, resembles the female figure of the Chicago terracotta with its dynamic movement and flowing drapery[15].

From a stylistic and iconographic standpoint, Strazzulla addressed the terracotta's striking similarities to the Gigantomachy Frieze of the Pergamon Altar, identifying parallels between specific figures and acknowledging the unusual nature of certain features, such as the atypical arrangement of the female's dress[16]. Moreover, Strazzulla outlined the varied use of the gigantomachy theme in Etruscan art. While popularly employed from the Archaic period in ceramics and bronze relief plaques, there is a dearth of representations of the subject among Etruscan architectural terracottas[17].

A limited number of comparisons date to the Archaic period, when giants were represented as Greek hoplites, not monsters. Examples include the life-size acroterial statues from Satricum and a group of fragmentary plaques depicting a gigantomachy with Athena from Vigna Grande (Orvieto), the latter of which may correspond to a similar group of fragments of unknown origin formerly in the Curtius Collection in Rome[18]. An even smaller number of examples dated to the Hellenistic period survive. The excavations at Pagliaroli di Cortino yielded two fragments (possibly from a pediment) depicting a large wing (perhaps from a giant) and a head of a helmeted figure, whose dramatic turn of the head and intense expression exemplify the Hellenistic Baroque style[19].

Representations of gigantomachies remain an uncommon subject in Etruria, with only one notable recent discovery: a cursorily worked fragment of a frieze from S. Rustico di Basciano, depicting an anguiped giant attacked by a quadruped, which adorned a temple to Hercules dated to the second half of the 2nd cent. B.C.[20].

Thus, the Chicago gigantomachy remains a rarity. One wonders whether this is due to its chance survival or to the seemingly greater popularity of other subjects – both from Greek myths and local Etruscan sagas – in Etruscan architectural sculpture of the Hellenistic period[21].

In view of the relief's surviving polychromy and its art-historical significance, this investigation explored questions pertaining to its fabrication (ceramic substrate, painting materials and application technique) and form with the aim of better understanding its original function and architectural context, the ancient Etruscan use of colour; and the type and construction of the figures' dress. These technical and cultural traits were found to be intertwined, as the study of colour revealed previously unseen details and materials, opening up new avenues of investigation into the meaning and significance of the gigantomachy within the sphere of Etruscan architectural sculpture.

10 Strazzulla 1991, 1164. See also Strazzulla 2007, 155.

11 Formerly in the collection of the Ny Carlsberg Glyptotek, Copenhagen, HIN 15A; see Christiansen et al. 2010, 158 f. This acroterion was one of approximately 450 works restituted by the Ny Carlsberg Glyptotek to Italy in 2016–2017. Email correspondence with J. S. Østergaard, 10 November 2020, curatorial object file.

12 The bottom edge of the base was reworked, likely in more recent times, to follow the oblique angle of the top edge. See Christiansen et al. 2010, 158.

13 Strazzulla 1991, 1164. The group's subject matter remains unclear, and various cultural, religious, and allegorical interpretations have been suggested. See Ross 2008, 319.

14 Massa-Pairault – Torelli 1985, 181–185; Ross 2008, 80 f. 319–21 cat. 298–302.

15 On the Minerva antefix, see Massa-Pairault – Torelli 1985, 182; Ross 2008, 319 cat. 298. A date in the late 3rd to early 2nd cent. B.C. has also been suggested. See De Grummond 2000, 262.

16 Strazzulla 1991, 1166–1170.

17 Strazzulla 1991, 1170; Strazzulla 2007, 155.

18 Strazzulla 1991, 1170. For Satricum, see Lulof 1991. For Orvieto, see Stopponi 1993. For ex-Curtius Collection, see Colonna 1993.

19 Messineo 1991, 181–184; Strazzulla 1991, 1170 f.

20 Strazzulla 2007, 155. 156, fig. 18. New scholarship on Etruscan terracottas has been published in the proceedings from the five *Deliciae Fictiles* conferences on architectural terracottas in ancient Italy and beyond. See, most recently, Lulof et al. 2019.

21 The question of the cultural, political, and religious significance of specific subjects employed in the architectural sculptures of Hellenistic Etruria has been addressed elsewhere. See Torelli 1999, 119–149; Strazzulla 2007.

Fabrication and Polychromy

Conservation History

While no conservation record is available, evidence of previous restoration is abundant throughout. With the exception of the torso of the giant, losses were overfilled liberally using a clay-like material that imparted a glossy sheen. Ultraviolet-induced luminescence imaging (Fig. 2) revealed a material – identified by FTIR as calcite-rich – that emitted a strong white light and corresponds to a restoration intervention imitating burial deposits, in particular over exposed break edges. X-ray radiography (radiograph not reported here) did not reveal the presence of any internal supporting structure. Holes in the necks of the two male figures – visible to the naked eye – only extend past their shoulders and are likely related to later interventions. A modern metal dowel extends from neck to waist inside the female figure.

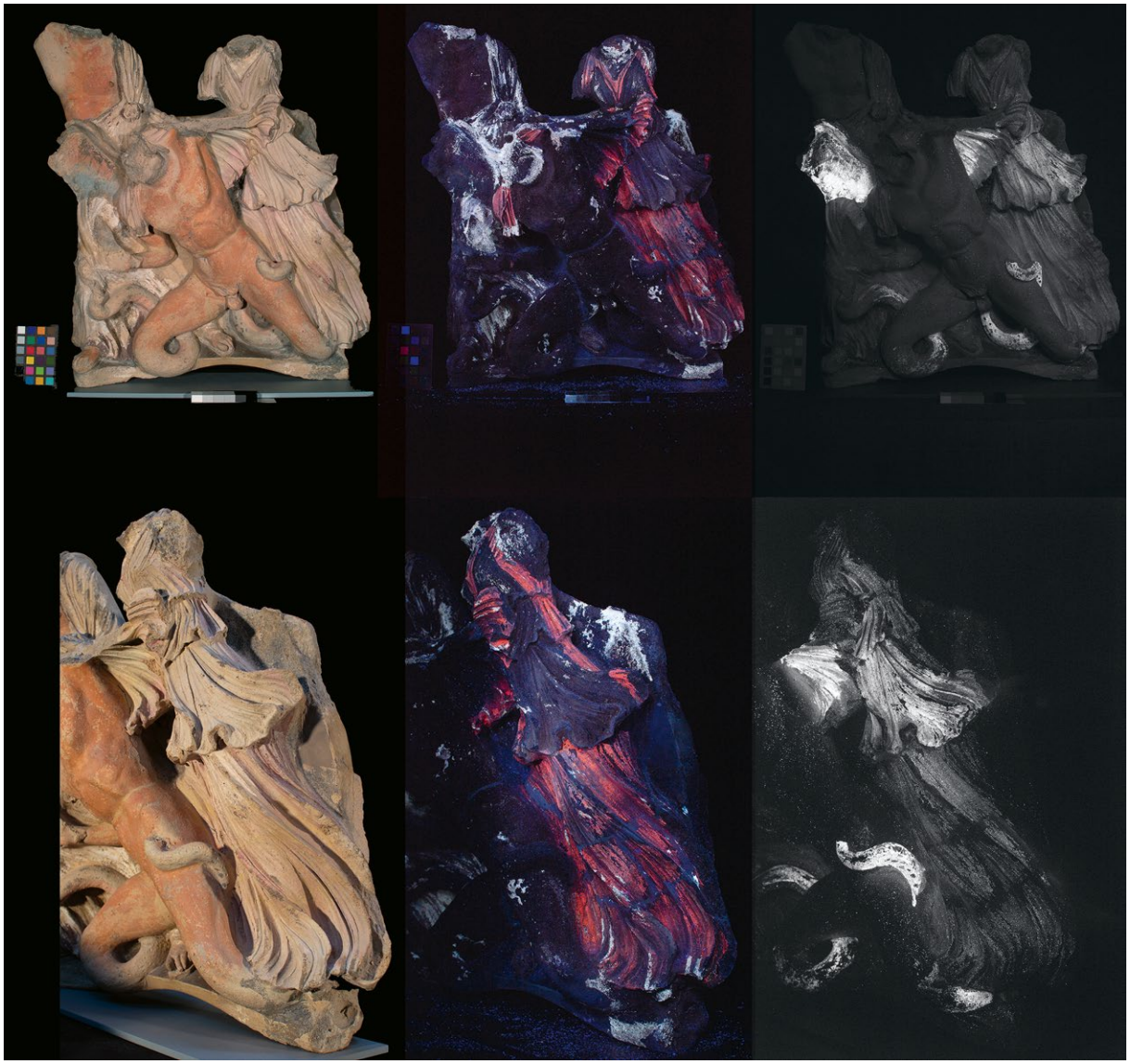
The Terracotta Structure

Care was taken in the fabrication of the terracotta to ensure that the vertical support was not visible from a presumably frontal-lower vantage point in its original context (see, for example, the deliberately thin and whittled strut with parallel lines bridging the female figure and the support, top view in Figs. 1 and 3 a). The illusion of freestanding figures animatedly moving in space was possibly enhanced by the black colour used for the ground beneath the figures and all exposed support was visible at the sides and between figures. The choice of black might also be related to the architecture that originally stood behind the terracotta. Most fabrication evidence points towards free-hand modelling. The figures were individually built up by amassing lumps of clay (seen clearly in x-radiography), refined by shaping and modelling, then luted to the support. Areas not intended to be seen were left rough (Fig. 3 a). Where the figures were luted in place, firing cracks between elements of the group have formed (Fig. 3 b). Smaller elements such as the feathers[22] and fasteners on the female figure's dress were fashioned separately (Fig. 3 c–e) and attached by hand, as demonstrated by fingerprints, which are abundant throughout (Fig. 3 e. f). A rounded tool(s) was used to articulate the folds of drapery, the feathers and the hair (Fig. 3 c and g–i). Hand-working ceramic brings ‹fines› to the surface resulting in a thin slurry, which fires as a skin. In many places, this skin has cleaved away, likely during burial, to reveal the larger aggregates below. The object has been hollowed out at the back to maintain a uniform wall thickness for firing. The wing offers some indication of mould usage, where the bottom two rows of feathers were luted onto an otherwise plain background, possibly a base model.

Blue

The blue pigment was identified as Egyptian blue[23] (Fig. 4) with three apparent absorption maxima at c. 535 nm, 630 nm and 790 nm (HSI in reflectance mode)[24], a luminescence emission in the infrared range (Fig. 2)[25], Raman shifts at 433 cm^{-1}, 380 cm^{-1}, 363 cm^{-1}, 137 cm^{-1} [26], and the presence of copper (XRF). FTIR analysis revealed the presence of various minerals associated with the blue pigment: gypsum[27], quartz[28], calcium oxalate (whewellite/weddellite[29]), and possibly kaolinite[30]. Raman spectroscopy revealed particles of calcite[31], hematite[32] and carbon-based black below and partially within the blue layer[33]. The spatial distribution of the blue pigment can be seen in the visible induced luminescence (VIL) image (Fig. 2 b)[34]. In the case of the wing, Egyptian blue is applied both directly onto the terracotta and on a red iron oxide layer and a carbon-based black. The VIL image also reveals Egyptian blue used in areas that appear cyan or green (e. g. the mantle of the giant), and in areas where no pigment is otherwise visible with the naked eye (e. g. the anguiform legs of the giant and the dress of the female figure). Individual particles of blue pigment were also observed in

22 There are gaps between and below the feathers, which would have been impossible to make, had the feathers been modelled in situ.
23 $CaCuSi_4O_{10}$.
24 Vezin – Roger 2007, 73.
25 Ajó et al. 1996, 43.
26 Bell et al. 1998, 2162.
27 $CaSO_4 \cdot 2H_2O$.
28 SiO_2.
29 $CaC_2O_4 \cdot (H_2O)_x$. Calcium oxalate is likely the degradation product of an organic material, such as a binder.
30 $Al_2(Si_2O_5)(OH)_4$; Miliani et al. 2009 and Miliani et al. 2012.
31 $CaCO_3$, Bell et al. 1998, 2165.
32 Fe_2O_3, Bell et al., 1998, 2164.
33 Bell et al. 1998, 2160.
34 Verri 2009.



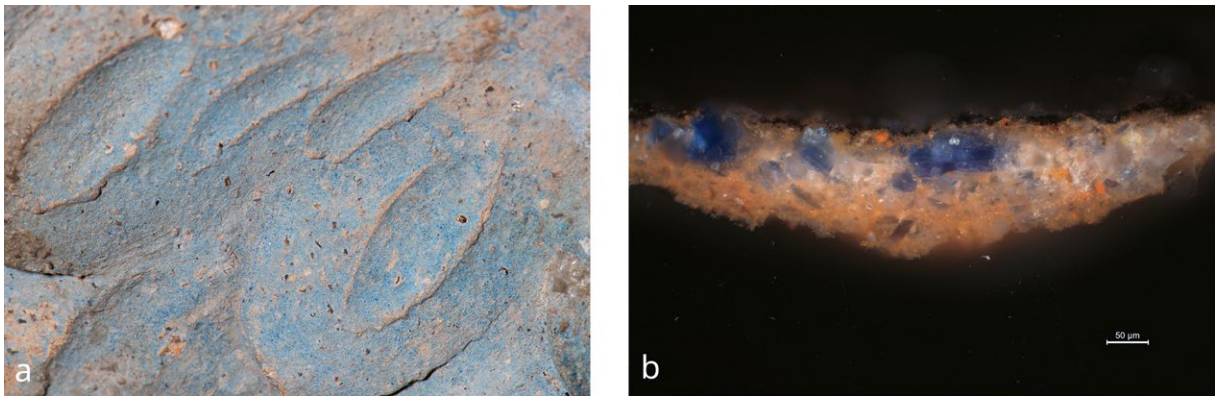
2 Two views of the terracotta with (a) ultraviolet- and (b) visible-induced luminescence images from different angles

the skin tones of the male figures. The disparate nature of these particles makes it difficult to determine if their presence was intended to modify skin colour or is the result of displacement of adjacent pigment[35].

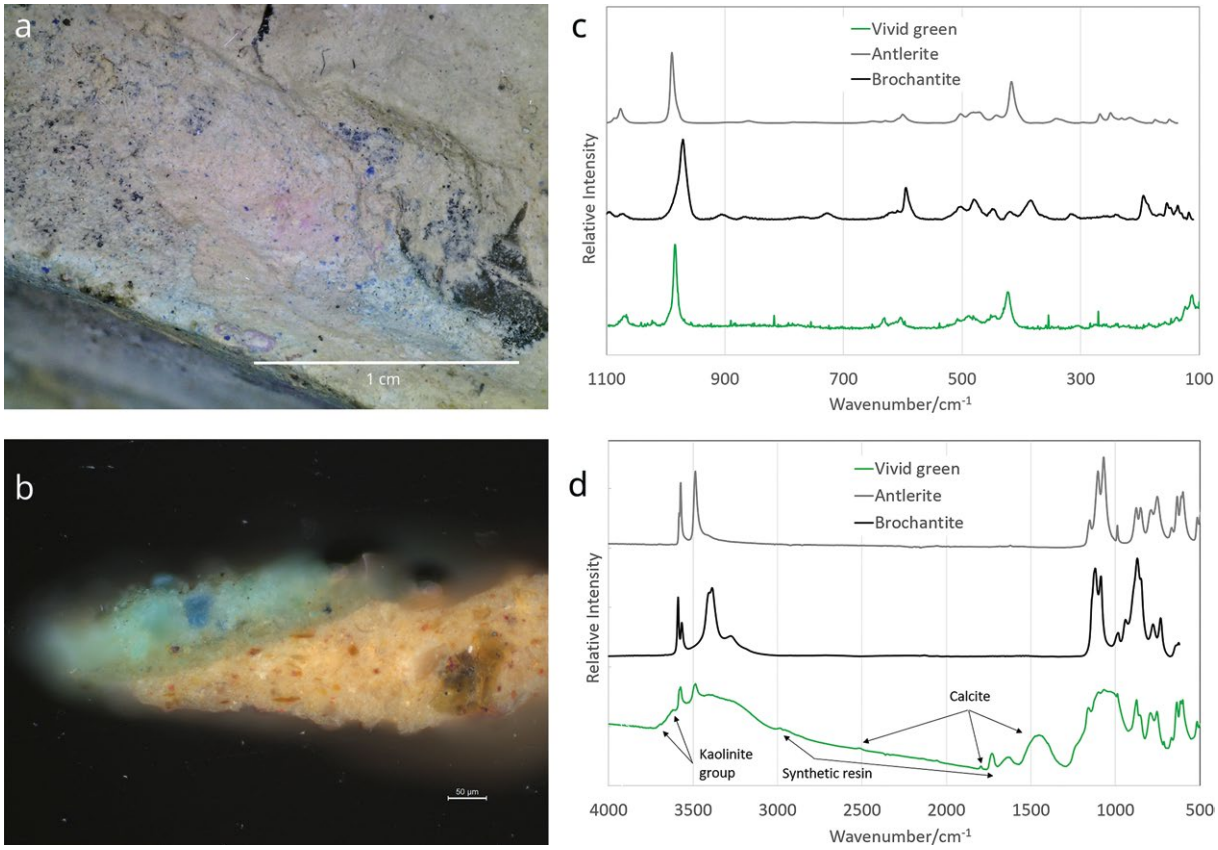
Blue has a long and widespread tradition in representations of demonic or winged figures. The aforementioned anguiped figures from the Tomb of Typhon are one example, alongside the vegetal goddess represented on the same pillar; other cases include the Tomb of the Blue Demons (end of 5th cent. B.C.) also near Tarquinia, and the figure of Vanth from the François Tomb now in the Torlonia Museum, Villa Albani, Rome (end of 4th cent. B.C.)[36]. Recently, Egyptian blue was also found on the legs of Skylla in the Tomb of the Reliefs (end of the 4th cent. B.C.)[37]. Blue-green textiles are also common in Hellenistic contexts and are possibly meant to represent woad- or indigo-dyed wool (*Isatis Tinctoria* L. or *Indigofera Tinctoria* L.), which are also attested in the archaeological record[38]. For example, figures in the François Tomb wear blue garments, and blue textiles are represented on the Amazon sarcophagus in the National Archaeological Museum in Florence[39].

35 On displaced Egyptian blue see Verri et al. 2010 and for Egyptian blue used in skin tones see Verri et al. 2014b.
36 Steingräber 2006.
37 Alfeld et al. 2018.
38 Stauffer 2012; Vanden Berghe 2011. See also Verri et al. 2014a.
39 Steingräber 2006.

3 Overall images and locations of details. a) Strut behind the female figure; b) Separation crack; c) Individually shaped feathers; d) Shoulder fastener and e) Belt buckle on female figure; f) Fingerprint on the giant's chlamys; toolmarks on g) chlamys, h) wing and i) hair



4 The blue pigment on the wing. a) Area analysed; b) Cross section in incident light



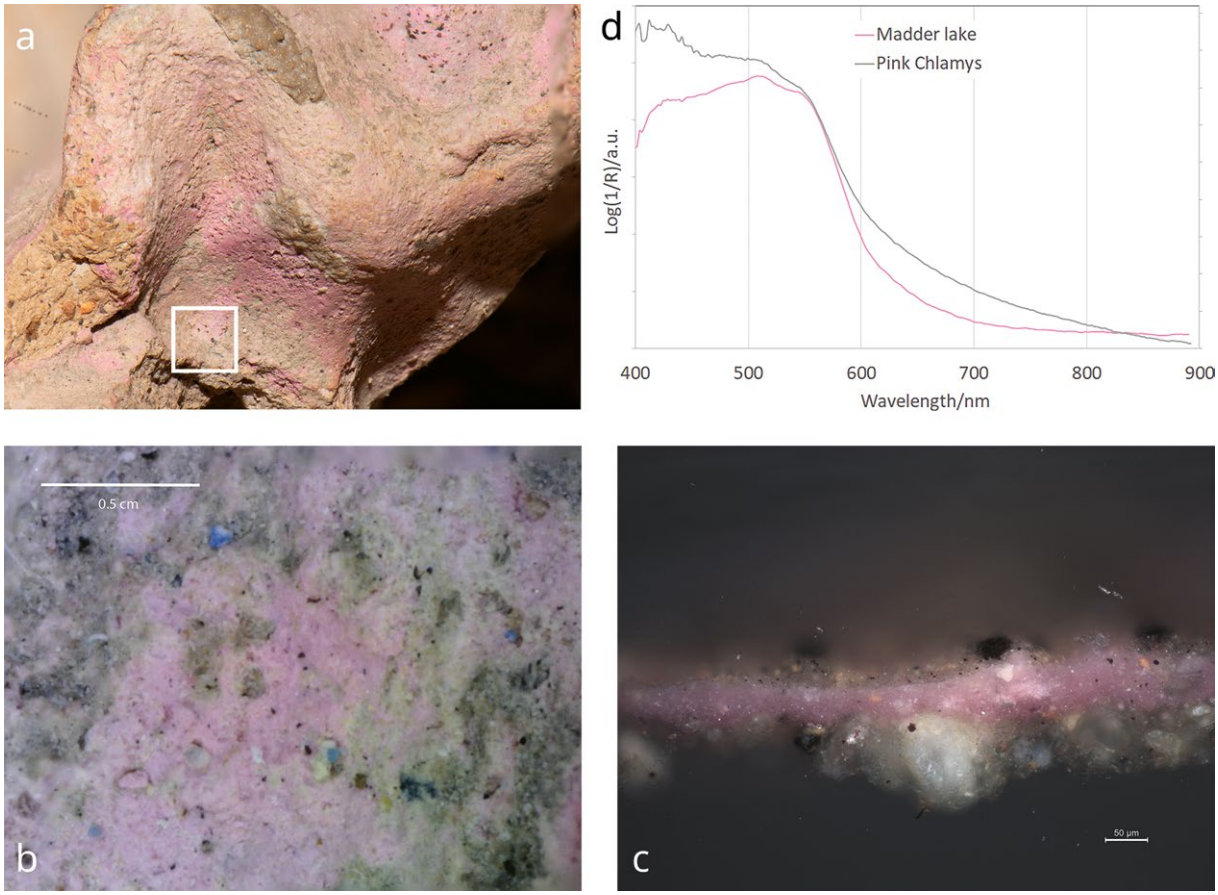
5 Analysis of the green pigment on the chlamys. a) Area analysed; b) Cross section in incident light; c) Raman spectroscopy of the vivid green areas with two reference spectra (antlerite and brochantite); d) FTIR spectroscopy of the same area with reference spectra (antlerite and brochantite; reference spectra from RRUFF database; Lafuente et al. 2015)

Cyan

As illustrated in Figures 2 and 5, the cyan colour is composed of a mixture of Egyptian blue (luminescence emission in the infrared range) and antlerite[40], the latter of which is visible in both the FTIR and Raman spectra. Small ν(OH) stretchings at 3399 cm^{-1} and 3274 cm^{-1} – and possibly a $\nu_4(SO_4^{2-})$ at 600 cm^{-1} – may correspond to the presence of brochantite[41]/posnjakite[42]. Calcite and possibly kaolinite were also identified with FTIR in the cyan layer. A residue of modern resin from a modern conservation treatment was detected (FTIR and Py-GC-MS)[43]. Antlerite might have been intentionally used as a pigment[44] since several mineral sources were available in Italy, including the ancient *fumarole* near Naples[45]. However, antlerite and brochantite/posnjakite are alteration products of malachite and precursors of the more stable oxalate moolooite[46] (neither of which were identified here) in the presence of oxalic acid and sulphate-rich environments[47].

Cyan is found in the giant's chlamys, the upper part of the female figure's dress and on the anguiform legs of the giant.

40 $Cu_3(SO_4)(OH)_4$; Secco 1988; Zittlau et al. 2013.
41 $Cu_4(SO_4)(OH)_6$; Zittlau et al. 2013.
42 $Cu_4(SO_4)(OH)_6 \cdot H_2O$; Zittlau et al. 2013.
43 Py-GCMS confirmed the presence of ethyl methacrylate (EMA) and methyl acrylate (MA). See Schossler et al. 2013.
44 Brecoulaki et al. 2006. Special thanks are owed to Hilary Becker for confirming the rare instances in which antlerite and madder (see below, note 60) have been detected on Etruscan objects.
45 <https://www.mindat.org/min-268.html> (08.08.2024).
46 $Cu(C_2O_4) \cdot nH_2O$.
47 Castro et al. 2008, 4016.



6 Analysis of the pink pigment on the chlamys. a. b) Area analysed; c) Cross section in incident light and d) spectroscopy of pink particles showing a comparison with a madder standard

Pink

As shown in Figure 6, the pink colour was identified as an anthraquinone of plant origin, likely from the *Rubia* L. genus, with characteristic apparent absorption maxima at c. 510 nm and 540 nm and a strong luminescence emission at c. 600 nm (HSI in reflection and luminescence modes)[48]. The support for the pink lake possibly includes kaolinite, on which the dye may be deposited[49], with relatively defined OH stretching bands at 3626 cm^{-1} and 3699 cm^{-1} and a less crystalline silicate (broad and strong antisymmetric Si-O modes at c. 1100–1000 cm^{-1}), as observed in the FTIR spectrum[50]. The distribution of the pink colour can be seen in the ultraviolet-induced luminescence image (Fig. 2 a), revealing previously unseen details of the dress of the female figure, such as the bands running along the side of the upper part of the garment. A commonly used pigment in antiquity during the Hellenistic period in Greece and Rome, madder, has been reported on Etruscan artefacts[51].

Orange/Red/Purple

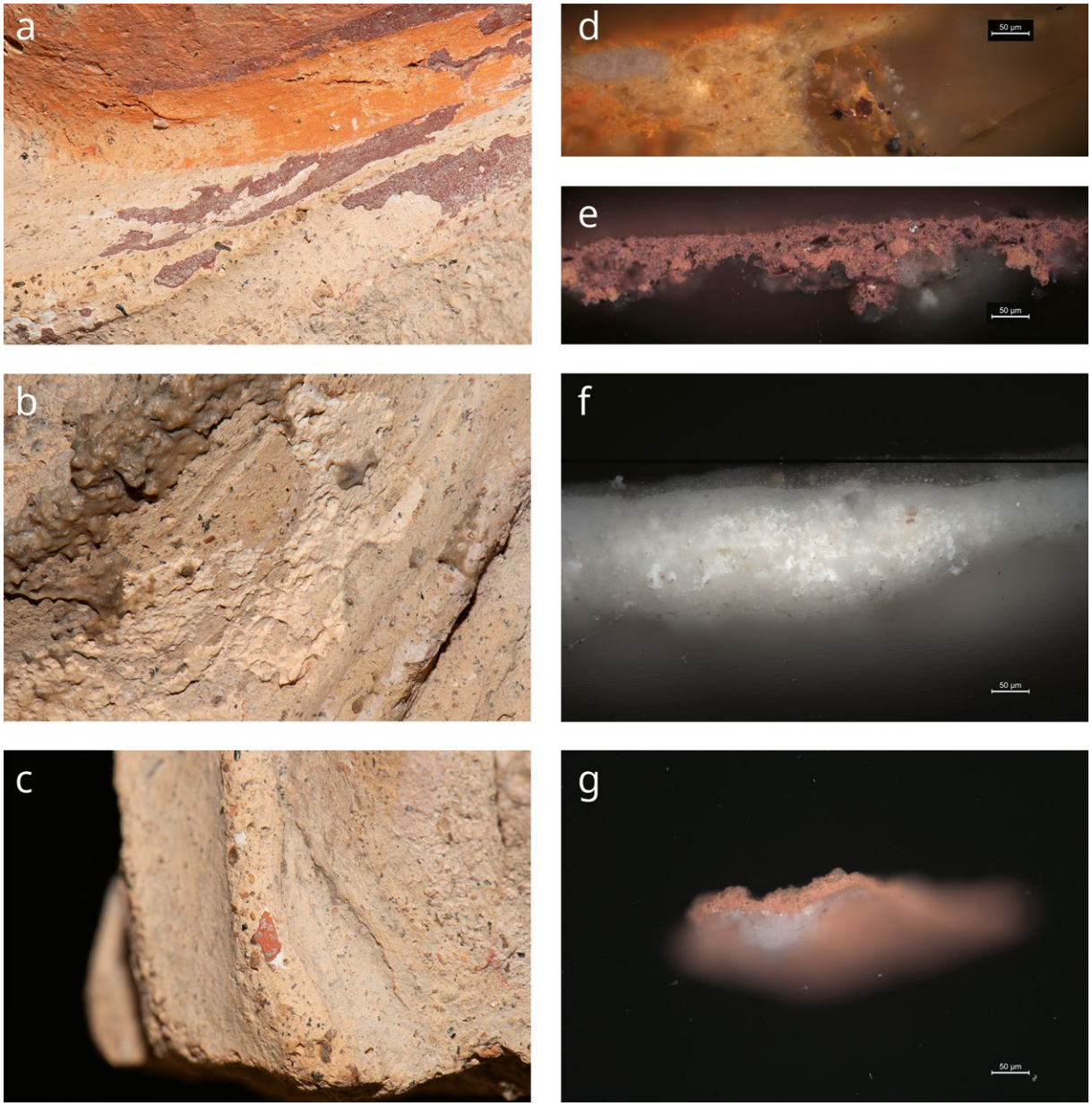
Hematite, applied directly to the surface of the terracotta, was identified in the orange/red skin tones of the male figures through an inflection point at c.

48 Bisulca et al. 2008, 6; Fonseca et al. 2019, 6 and De la Rie 1982, 4.

49 The type of bond, if any, between the colourant and the clay is not clear. The term ‹deposited› is used here to indicate a generic relation between colourant and clay.

50 Bich et al. 2009, 198.

51 Joyner 2002, 50; Gagliano Candela et al. 2009, 8 and Bordignon et al. 2007, 95. While a historic restoration with madder lake cannot be excluded, it appears unlikely in this instance, given its complex and somewhat unexpected use; as described below, the pink pigment was applied to represent now-invisible details, such as decorative bands along the dress of the female figure and in mixture with Egyptian blue.



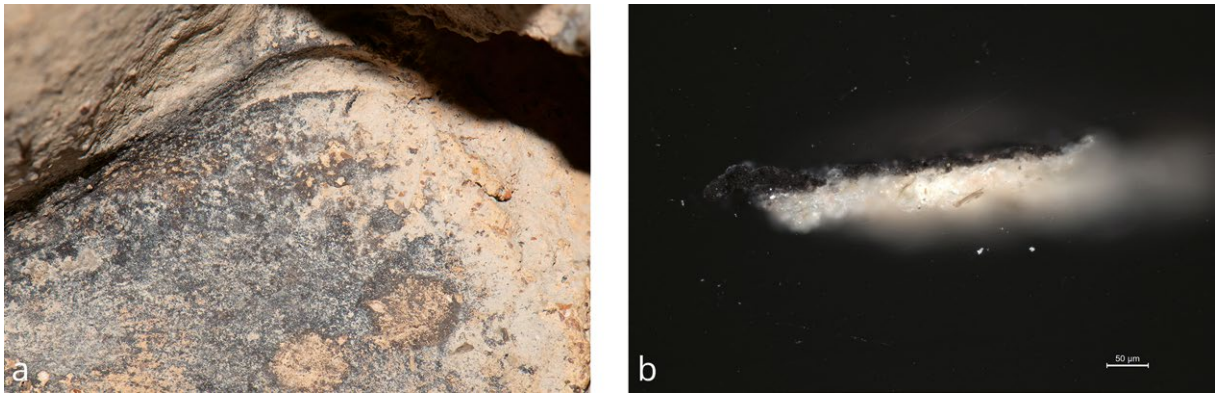
7 The red and white pigments. Area analysed: a) Male skin tone and purple/red over the white himation of the male god; b) Female skin tone; c) Vivid red himation of the female goddess; d–g) Cross sections in incident light

580 nm and an apparent absorption at c. 875 nm (HSI in reflectance mode). Raman spectroscopy also confirmed the results (Fig. 7)[52].

By contrast, Raman spectroscopy indicated that the female skin tones consist of a calcite layer, with a small amount of hematite (HSI in reflectance mode) imparting a light buff colour, below a translucent gypsum layer. The exact function and origin of the gypsum layer is not clear and it might be either a deliberate finishing (?) paint layer or a degradation product of calcite.

The deep purple/red on the border of the mantle of the male figure and the vivid red on the mantle of the female figure are made of hematite (Raman; FTIR) applied over a layer of calcium carbonate with a poorly crystalline silicate (FTIR). The deep purple/red paint layer was also found to contain a carbon-based black pigment (Raman).

52 Aceto et al. 2014, 1491.



8 The black and white pigments. a) Area analysed; b) Cross section in incident light

Visually, the red pigment used for the male figure's himation might be the same one as that used for the female figure, with the addition of a carbon-based black pigment to achieve a more purple hue. By contrast, the more orange hue used for the male skin tones may be related to a different geological source.

White

The white mantle of the male figure is composed mainly of calcite (FTIR) with a poorly crystalline silicate/clay (FTIR) component (Fig. 7 a. e).

Black

The black pigment was identified as carbon-based (Raman) above a white layer containing anatase (Fig. 8) (Raman). Anatase can be found in natural clays but may also be related to contamination from a later restoration[53]. Analysis was only performed on a small number of areas and the black paint layer appears to be ancient.

Binding Media

Selected paint samples were further analysed by FTIR and Py-GCMS for binding medium characterization. A broad band in the infrared spectra centred at 3350 cm^{-1}, which is characteristic of ν(OH) stretching vibrations, together with strong bands at around 1035 cm^{-1} attributable to C–O bonds, are indicative of polysaccharide-based material, such as plant gum. This finding was supported by analysis of both a white (Fig. 7 a) and blue (Fig. 4 a) sample by Py-GCMS, based on the detection of methylated monosaccharide derivatives[54]. While there is no analytical indication of polysaccharide compounds in the restoration material imitating burial deposits, the use of plant gums during the same or another restoration intervention cannot be ruled out. Further analyses will provide more precise information.

Study of the Dress

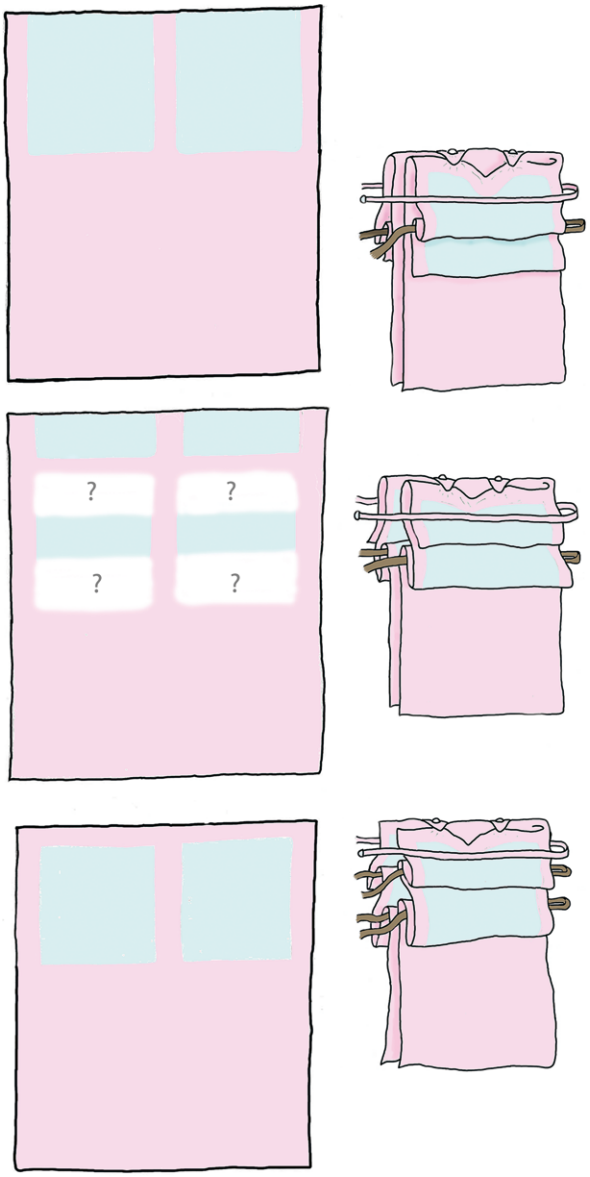
While the figures represented in the gigantomachy are mythical, their clothes have close parallels to those worn in ancient Greece and Etruria[55]. It is possible to study the construction of these outfits and thereby determine which elements might correspond to historical clothing, as opposed to artistic conven-

53 Bordignon et al. 2007, 94.
54 Riedo et al. 2010.
55 Bonfante 1975; Pekridou-Gorecki 1989.

tion or imagination. The male figure and the giant appear to wear a white himation with a wide purple band[56] and a cyan short chlamys bordered in pink, respectively[57]. By contrast, the dress of the female figure is more difficult to interpret. Strazzulla describes her as wearing a tunic (chiton) with an exposed belt under the breasts and two hidden belts, creating two folds at the waist and hip levels. The few comparisons that can be found include two flanking female figures on an urn in Florence[58].

Interpretation of the construction of the dress is complicated by the stylized rendering of the terminal ends of the two distinctive billowing textile elements (one at hip and one at waist level). Do they correspond to the loose ends of a textile (e. g. a hem or selvage, such as the overfold of a garment known as peplos) or to overhanging, blousing folds created by a hidden belt[59]?

Technical imaging helped to elucidate these questions, by revealing that the upper and lower parts of the dress have different colour schemes[60]. The lower part was painted pink (madder lake) and the upper section blue/green (Egyptian blue and a green pigment, possibly antlerite). Madder lake was also used for the decorative lateral and neckline bands framing the upper section. Blue and pink partially overlap in some areas (for example, the upper bands), perhaps suggesting that the artist was attempting to achieve a purple colour. The ambiguous rendering of the billowing textile elements allows two additional possibilities to that posed by Strazzulla. All three possible typologies have in common an exposed belt below the breasts with a central buckle. Figure 9 shows three flat patterns alongside a schematic representation of the textile folded around the body to achieve the appearance observed on the terracotta. A similar visual appearance can be achieved by draping a textile of the same size in three different ways, each of which however required a different colour scheme.



9 Approximate flat patterns (left) and schematic representation of the draped textile (right). The patterns and related draped textile are positioned at shoulder height.

56 The bundle of textile on the proper left side of the standing male figure is reminiscent of, for example, Asklepios from Epidaurus at the National Archaeological Museum in Athens (inv. 263).

57 A comparison for this colour scheme, albeit one inverted and from another cultural context, is seen in the Hellenistic mummy case from Akhimim and now at the British Museum (inv. EA29587). For the construction of the himation and chlamys, see, for example, Pekridou-Gorecki (1989, 82 f. 87–90). The bundle of fold at elbow level of the standing male figure finds some parallels in, for example, the funerary stela of a warrior (Diepolder 1931, pl. 32) and the Asklepios of the ‹Este› type.

58 Museo Archeologico Nazionale di Firenze, Urn 70; Brunn – Körte 1870, LI, 1; Strazzulla 1991, 1168.

59 Ancient dress terminology is complicated by the lack of well-defined terms. A fold and overfold of a peplos are commonly (and likely erroneously) referred to as kolpos and apoptygma (Lee 2004 and Jones Roccos 2000, 245).

60 Differences in decorative patterns in the same woven textiles are common during the Hellenistic period. See, for example, Musée du Louvre, inv. Myr 163.

Type 1

Peplos with a long overfold reaching the hip. The lowest textile element at hip level corresponds to the lowest section of the overfold with a hidden belt at waist level, creating a blousing effect on the overfold itself[61].

Type 2

Peplos with a short overfold reaching only to the waistline. The lowest textile element at hip level is created by folding the fabric under the overfold with a hidden belt[62]. The proposed colour scheme under the blousing folds is speculative and indicated with a question mark[63].

Type 3

Strazzulla's hypothesis: a tunic/chiton with two folds at hip and waist level created by two hidden belts[64].

For each type, the garment is woven to the measurements of the wearer and, while the size of the textile is the same, the colour scheme changes according to the draping arrangement[65].

Conclusions

While the original context of the terracotta remains a matter of speculation, this study revealed useful elements toward a better understanding of its narrative. The presence of madder with possibly plant gum as paint binder, two materials prone to deterioration, makes for an improbable choice in the decoration of an object destined for an exterior setting (i. e. an antefix or acroterion). Such decoration could have been protected by means of a transparent coating, but no such evidence of this has been found. The use of comparatively fragile materials lends weight instead to its being positioned indoors (e. g. a shrine or tomb)[66] or in a protected location under a roof or beam.

The artist(s) carefully considered the relationship between the figures and the viewer by shaping the vertical support to create the illusion of free-standing sculpture. The black ground, which was possibly related to the colour of what was originally behind the terracotta, further enhances the effect of freestanding sculpture.

Detailed pigment analysis, together with the application of imaging techniques, provided valuable insights into the Etruscan palette, the colour schemes of Hellenistic textiles and their relationships to the wearer. In addition, this research shows how scientific analysis can also be of particular importance in the interpretation of ancient fashion, given how few textiles – let alone full garments with original dyes – survive.

61 Although a relatively uncommon fashion, see, for example, the acroterial Nike in the Stoa of Attalos in Athens (inv. S 312). For a technical description of the peplos, see Pekridou-Gorecki 1989, 77–82.

62 Also an uncommon fashion, likely intended to facilitate movement for the wearer as in the previous case, this type is attested, for example, on the kneeling figure (O) from the east pediment in Olympia and an Etruscan mirror at the Metropolitan Museum of Art (inv. 97.22.17).

63 The colour scheme of the areas under the fold is unknown for the other two types as well, but the proposed reconstructions seem less speculative because of their simpler colour scheme.

64 The drawing by Kunn and Korte is itself an interpretation leaving unresolved questions. Examination of a photograph kindly provided by the National Archaeological Museum in Florence leaves the question open. An in-person inspection may provide a clearer answer. A double fold of this type is found in Louvre BR297, albeit under an overfold. A more convincing representation of this type of dress can be seen on Makron's skyphos (inv. 13.186) at the Museum of Fine Arts in Boston, where Helen, unveiled by Aphrodite, apparently wears a chiton with two folds. A red belt is visible below the bottom fold. This example can be more confidently considered as a chiton with two folds, especially when compared to Chryseis' similar chiton on the same vase. The top section of Chryseis' dress is represented differently (with an ending similar to the ‹hem› of the ‹skirt› of the chiton by the feet) and is therefore most likely intended to depict an overfold, rather than a fold, as for Type 2. However, none of these examples has a third belt below the breasts.

65 Granger-Taylor 1982.

66 While this interpretation remains at this stage speculative, a possible comparative precedent for the use of relief decoration in a funerary context could be the 4th-cent. B.C. relief decoration from the Tomb of the Reliefs in Cerveteri (Caere). However, those reliefs were carved from the tufa bedrock of the tomb and then stuccoed and painted. They represent objects from daily life (with some allusions to the afterlife), rather than Greek mythological scenes. Nevertheless, they still attest to the use of relief decoration in Etruscan tomb contexts (Brendel 1978, 405 f.).

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Methodology

An iterative methodology was used, starting with non-invasive imaging (broad-band[67], hyperspectral in reflection and luminescence modes (HSI)[68] and X-radiography[69]) and X-ray fluorescence spectroscopy (XRF)[70]. Further analysis was carried out on microscopic samples and cross sections[71] using Fourier transform infrared spectroscopy (FTIR)[72], Raman spectroscopy[73] and pyrolysis gas chromatography mass spectrometry (Py-GCMS)[74].

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67 Modified Nikon D3200 (sensitivity range: c. 365–1000 nm) and Nikon SB-80DX xenon flashtubes, equipped with band-pass filters (Verri – Saunders 2014).

68 Resonon Pika II Pushbroom (sensitivity range: c. 400–900 nm), equipped with tungsten-halogen radiation sources for reflectance measurements and a 365 nm LED for ultraviolet-induced luminescence hyperspectral imaging.

69 Philips/Yxlon X-ray tube MCN321, 140–160 kV; 5 µA; 2 mins; 0.010 filter behind film; 0.9 m distance from film.

70 Bruker ARTax (Mo tube, 50 kV, 200 µA, 200 s, 1.5 mm collimator).

71 Samples were mounted with Kulzer Technovit 2000 LC resin and examined with a Zeiss Axioplan 2.

72 Bruker Hyperion microscope (MCT detector, sensitivity range 4000–400 cm^{-1}, 4 cm^{-1} resolution, 256 acquisitions).

73 Jobin Yvon Horiba LabRAM 300 confocal Raman microscope (532 nm, 632.8 nm and 785.7 nm lasers, 100× objective, power at sample < 1 mW).

74 For instrumental details see Langley et al. 2020.

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